

**UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION**

LEAGUE OF WOMEN VOTERS
OF MICHIGAN, et al.,

Plaintiffs,

v.

RUTH JOHNSON, in her official
capacity as Michigan
Secretary of State, et al.

Defendants.

Case No. 2:17-cv-14148

Hon. Eric L. Clay
Hon. Denise Page Hood
Hon Gordon J. Quist

DECLARATION OF YAN LIU

I, Yan Liu, declare under penalty of perjury and pursuant to 28 U.S.C. § 1746, as follows:

1. I am over 18 years of age and am competent to testify.
2. I have personal knowledge of the matters set forth below.
3. This Declaration supplements my Declaration of December 3, 2018 in this matter.
4. Chen's java code file is sequential. This means that regardless of how many processor cores a computing server has, one run of his code can only use one processor core. This limits the "speed" that can be gained in running his simulation using any type of computing resource, including supercomputing resources. Furthermore, as I previously noted, his draft code for his State House simulation is explicitly instructed to produce a plan only after it has attempted for at least *40 days*, even when running on the fastest computer in the world.
5. In paragraphs 29 to 31 of my December 3, 2018 Declaration, I noted that I was able to tell from readable portions of Chen's decompiled byte code files that the "final" byte code differed from the "draft" source code in material ways including as regards Chen's instructions on compactness, instructions on county

breaks, and instructions on MCD breaks, each of which would have impacted the drawing of plans by his simulations.

6. Chen's draft source code for the State Senate measures the compactness based on the estimated bounding circle area, and instructs that his simulation is to take the best of 1,000,000 improvements. These instructions differ from the decompiled byte code, which does not measure compactness in the simulation. This can be seen by comparing Lines 306-328 in Chen's "draft" source code against lines 471-490 in his decompiled byte code.

7. Chen's draft source code for the State House measures compactness based on the estimated bounding circle area, whereas his decompiled byte code measures compactness based on the ratio of district area and district's bounding box area. These are different compactness measures. His State House draft code also includes a county break constraint of 27, whereas the decompiled byte code includes a county break constraint of 14. Finally, his State House draft code includes an MCD split constraint of 14, whereas the decompiled byte code includes an MCD split constraint of 13. These differences can be seen by comparing lines 288-307 of his draft source code against lines 482-507 of his decompiled byte code.

8. Chen's decompiled byte code for the Congressional plans is incomplete. That is, the Java decompiler was not able to interpret all of Chen's bytecode, and thus the decompiled version does not include some portions of the bytecode. As I did not have a full set of decompiled byte code instructions, I did not make comparisons for the Congressional simulation code.

9. The above-noted changes between the draft code and decompiled byte code show that Chen made significant, non-cosmetic changes to the "draft" version before compiling it.

10. I already identified significant changes between Chen's draft code and decompiled byte code. If I had the final source code, I anticipate that I would be able to identify all the changes.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Yan Liu



12/19/2018

Dated